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PHYSICAL FITNESS OF CHILDREN FROM 10 TO 15 YEARS WHO ARE ENGAGED IN KYOKUSHIN KARATE

Svitlana Kalytka[1], Ninel Matskevych [2], Valeriy Kuznyetsov[3], Anastasiya Povyetkina[4], Vasyl Shevchuk[5]

[1] Ph. D. in Physical Education and Sports, Associate Professor in the Department of Theory of Physical Education, Fitness and Recreation. Lesya Ukrainka Eastern European National University, Lutsk, Ukraine, Kalytka. Svitlana@eenu.edu.ua
[2] Ph. D. in Physical Education and Sports, Associate Professor in the Department of Sports–mass and Tourist Work. Lesya Ukrainka Eastern European National University, Lutsk, Ukraine, matskevych.ninel@eenu.edu.ua
[3] Lecturer in the Department of Physical Education. Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine, Kuznetsovvaleriy77@gmail.com
[4] Lecturer in the Department of Physical Education. Kyiv National Economic University named after Vadym Hetman, Kyiv, Ukraine, Kuznetsovanastya85@gmail.com
[5] Kyokushinkaikan Karate Ukrainian Federation, Ukraine, shershen.ua@gmail.com

Abstract

The relevance of the study is caused by the lack of data in content and organization of training process in Kyokushin Karate and impact on the physical fitness of children 10–15 years old. ***Purpose:*** to determine the effect of Kyokushin Karate on the physical fitness of children aged 10–15 years. ***Methods*:** analysis and synthesis of scientific and technical literature; summarizing advanced practices of training children karate; pedagogic observation of a training activities and pedagogical experiment; examination tests; methods of mathematical statistics. We have found that practicing Kyokushin Karate has a significant impact on the development of all the physical qualities of children 10–15 years. Training karate youngsters in macrocycle includes the development and improvement of all aspects of general and special training and meets the principles of sports training. The obtained data show that children who are involved in Kyokushin Karate have high–speed movements for applying powerful strikes by their arms and legs. This is achieved by special training, which includes a large variety of exercises using different kinds of equipment: med balls, rubber loops, dumbbells, skipping ropes, boxing paws, pads and others. ***Conclusions*:** it was determined that the level of physical fitness of children 10–15 years who are engaged in Kyokushin Karate for the year is reliably increasing, especially in the performance strength ($p < 0,01$), endurance ($p < 0,01$), dexterity ($p < 0,01$) and velocity ($p < 0,01$), which is caused by a corresponding amount of the training sessions with the complex challenges; set probable kick speed increase by the right hand in the 11–13 years old children ($p<0,05$), by the left hand in the 14–15 years old children ($p<0,05$), by the right foot in all age groups ($p < 0,01$) and left foot in 11–13 ($p<0,01$) and 14–15 ($p<0,05$) years old children, which indicates a high level of special preparedness of children 10–15 years old who are engaged in Kyokushin karate.

Key words: Kyokushin Karate, physical preparedness, children of 10–15 years old, physical fitness equipment, physical qualities.

Світлана Калитка, Нінель Мацкевич, Валерій Кузнєцов, Анастасія Повєткіна, Василь Шевчук. Фізична підготовленість дітей 10–15 років, які займаються Кіокушин-карате. *Актуальність дослідження* зумовлена відсутністю даних про зміст та побудову тренувального процесу в Кіокушин-карате й впливу на фізичну підготовленість дітей 10–15 років. ***Мета* –** визначити вплив Кіокушин-карате на фізичну підготовленість дітей віком 10–15 років. ***Методи* –** аналіз й узагальнення науково-методичної літератури; узагальнення передового практичного досвіду підготовки дітей-каратистів; педагогічні спостереження за тренувальною діяльністю та педагогічний експеримент; контрольні тести; методи математичної статистики. Нами встановлено, що заняття Кіокушин-карате має значний вплив на розвиток усіх фізичних якостей дітей 10–15 років. Підготовка юних каратистів у макроциклі включає розвиток та вдосконалення всіх сторін загальної й спеціальної підготовленості та відповідає всім принципам спортивного тренування. Отриманні дані показують, що діти, які займаються Кіокушин-карате, володіють високою швидкістю рухів для нанесення потужних ударів руками й ногами. Усе це досягається спеціальною підготовкою, яка включає велику кількість різноманітних вправ із застосуванням різних предметів: метболи, резинові петлі, гирі, скакалки, лапи, пади та ін. ***Висновки*.** Визначено, що рівень фізичної підготовленості дітей 10–15 років, які займаються Кіокушин-карате, протягом року вірогідно зростає, особливо за показниками сили ($p<0,01$), витривалості ($p<0,01$), спритності ($p<0,01$) та швидкості ($p<0,01$), що зумовлено відповідним тренувальним обсягом занять із комплексним виконанням завдань; установлено вірогідний приріст швидкості ударів правою рукою в дітей 11–13 років ($p<0,05$), лівою рукою – у дітей 14–15 років ($p<0,05$), правою ногою – у всіх вікових груп

(p<0,01) і лівою ногою – у дітей 11–13 років (p<0,01) та 14–15 років (p<0,05), що свідчить про високий рівень спеціальної підготовленості дітей 10–15 років, які займаються Кіокушин-карате.

Ключові слова: Кіокушин-карате, фізична підготовленість, діти 10–15 років, засоби фізичної підготовки, фізичні якості.

Светлана Калитка, Нинель Мацкевич, Валерий Кузнецов, Анастасия Поветкина, Василий Шевчук. Физическая подготовленность детей 10–15 лет, которые занимаются Киокушин-каратэ. *Актуальность исследования* обусловлена отсутствием данных о содержании и построении тренировочного процесса в Киокушин-каратэ и влиянии на физическую подготовленность детей 10–15 лет. ***Цель –*** определить влияние Киокушин-каратэ на физическую подготовленность детей 10–15 лет. ***Методы –*** анализ и обобщение научно-методической литературы; обобщение передового практического опыта подготовки детей-каратистов; педагогические наблюдения за тренировочной деятельностью и педагогический эксперимент; контрольные тесты; методы математической статистики. Нами установлено, что занятия Киокушин-каратэ имеет значительное влияние на развитие всех физических качеств детей 10–15 лет. Подготовка юных каратистов в макроцикле включает развитие и совершенствование всех сторон общей и специальной подготовленности, а также соответствует всем принципам спортивной тренировки. Полученные данные показывают, что дети, которые занимаются Киокушин-каратэ, обладают высокой скоростью движений для нанесения мощных ударов руками и ногами. Все это достигается специальной подготовкой, которая включает большое количество разнообразных упражнений с применением разных предметов (метболы, резиновые петли, гири, скакалки, лапы, пады и др.). ***Выводы.*** Определено, что уровень физической подготовленности детей 10–15 лет, которые занимаются Киокушин-каратэ, в течение года достоверно возрастает, особенно по показателям силы (p <0,01), выносливости (p <0,01), ловкости (p <0,01) и скорости (p <0,01), что обусловлено соответствующим тренировочным объемом занятий с комплексным решением задач; установлено вероятный прирост скорости ударов правой рукой у детей 11–13 лет (p <0,05), левой рукой – у детей 14–15 лет (p <0,05), правой ногой – во всех возрастных групп (p <0,01) и левой ногой – у детей 11–13 лет (p <0,01) и 14–15 лет (p <0,05), что свидетельствует о высоком уровне специальной подготовленности детей 10–15 лет, которые занимаются Киокушин-каратэ.

Ключевые слова: Киокушин-каратэ, физическая подготовленность, дети 10–15 лет, средства физической подготовки, физические качества.

Introduction. Karate origins are dated more than two thousand years ago. Indian monk Dharma, who fled from persecution to China, being in the monastery of Shao Lin taught his students with help of physical training in order to develop the ability to endure and develop physically. He has developed that harsh discipline to the part of his religion. These principles and methods of physical training was aimed to further development and improvement of the individual, and at the same time were known as the Shao Lin art of combat (fighting). Thanks to its efficiency this art was required by the monks of the monastery for protection from armed attacks of the nomads. Without weapons, Shao Lin monks found a way to protect themselves and the monastery, studying and perfecting the art of unarmed combat, inherited from Dharma. Subsequently, the fight spread across ancient China and the entire East. Natives of Shao Lin, settling in new places, have formed their own schools, improving their skills, which migrated to the island of Okinawa, where they have mixed with native types of struggle and have strengthened as a result of practical application. Kagoshyma Lord, who had the possession on the south of island Kiushu in Japan, has banned using a weapon on pain of death, so big upsurge of fighting techniques were okinavate («Okinawa hand») [1; 4; 7; 8]. Gradually, okinavate became the property for only samurai and noble dynasties that preserve the secrets of that martial art, passing their knowledge inherited – from generation to generation. That martial art was first shown to Japanese public in 1922 by a master from Okinawa Funakoshi Gichin. His struggle he called Karate («empty hand»). Karate style Kyokushinkai – athletic, power, dynamic, active and aggressive. Its tools are arsenal of rational and the most effective techniques. Kyokushin Karate develops physical qualities, promotes health, and affects the development of volitional and moral qualities. Literature analysis shows that the questions of physical fitness of children and adolescents are not enough covered. There are a small number of works that focus on the history of Kyokushin Karate [2; 3], general information about the development of physical qualities [4; 6] and psychological training. We have not found works that focus on physical preparation, including children aged 10–15 years who are engaged in Kyokushin Karate, that is why current direction of our research is topical.

The aim of the study – to determine the effect of Kyokushin Karate on the physical fitness of children aged 10–15 years.

Materials and Methods of Research. To achieve the objectives the following methods were used: analysis and synthesis of scientific and technical literature; summarizing advanced practices of training

children karate; pedagogical observation of a training activities and pedagogical experiment; examination tests; methods of mathematical statistics.

The research involved children aged 10–15 years who are engaged in kyokushin karate for 2–3 years. To assess the various aspects of physical fitness of children the following tests were used: the speed – running 30 meters and 100 meters, number of strikes with the left and right hand for 15 seconds, and right and left foot; the strength – hands flexion – extension in the emphasis lying and pulling up on a crossbeam; the agility – shuttle run 4 to 9 meters; the endurance – the 800 meters distance running.

Research Results. Discussion. During the preparation of young karatekas, we follow all the principles and methods of training, which provide the best training and result. The annual cycle of training consists of three macrocycles. During the year the team participates in many tournaments and championships. However, there are two major ones: Volyn region Open Championship and Championship of Ukraine. We approach to the preparation and performance in these tournaments respecting existing laws incipience sports skills including karatekas' physical abilities [5].

The preparation during the macrocycles and participation in the competition last about 3–4 months and includes 4 mesocycles: initial, base, pre–competitive and competitive. Each mesocycle consists of 3–4 microcycles that enable us to best approach the preparation of karatek.

Initial mesocycle lasts from 2 to 3 weeks. It is aimed to prepare the karatekas body to large loads. Most often these are training sessions at low and medium loads. However, 1–2 sessions with large loads are planned. Training session consists of three parts: 1 – warm–up (running, general developmental exercises, special exercises, simulation «kumite»), 2 – technical part (kata, kihon, idoheyko), 3 – special physical training (mainly special exercises aimed to develop an explosive and static strength, endurance, flexibility and other physical properties). One example of such classes is training according to the system Krosfit, which focuses on the development of explosive strength, the most important quality for kyokushin karate. It is a program of strength exercise which consists of constantly changing functional exercises of high intensity. The complex proposed by us consists of ten exercises, each of which runs 20 seconds. Total one approach time lasts 3 minutes 20 seconds, which in its turn simulates the fight on the mat (a fight on the mat for children lasts 2 minutes plus 1 extra minute), after that a rest for 1 minute is taken. Athletes perform three of such approaches. Base and pre–competitive mesocycles take 2 months and are the most important in karatekas preparation. The proposed system, which called «Budo» in karatekas preparation process, includes achievements of battle tactics and strategy, learning and improvement of strikes, combinations: move, attack tactics, tactics of defense, counterattack, working punches, combinations working, and opponent evaluation. Competitive mesocycle envisage participation in competitions. Often in this cycle karatekas participate in 2–3 tournaments.

Therefore, the preparation of young karatekas in the macrocycle includes the development and improvement of all aspects of general and special training and meets the principles of sports training.

The data in Table 1 indicate that the rate of speed (running 30 meters) during the year has reliably increased (p <0, 01). Also the performance results of running speed of 100 meters distance among children 11–13 years old (p <0,01) have increased. However, among children aged 14–15 years a slight increase in speed endurance can be found, which may be the termination of sensitive periods of speed development. We have found a credible increase of explosive strength and speed endurance resulting from the use of large quantities of jumping exercises.

Table 1

Karatekas Speed Performance Among 10–15 Years Old

Age	Run 30 m (s)with n/s	Run 100 m (s)
2014–2015 Academic Year		
10–12	4,54±0,18	18,53±0,07
13–14	4,01±0,02	15,37±0,05
2015–2016 Academic Year		
11–13	4,33±0,15**	18,03±0,06**
14–15	3,86±0,02**	15,22±0,04

**** – possible difference p< 0,05; ** – possible difference p< 0,01 of results increment.***

About dynamic force development we judged by performance flexion and extension hands in the emphasis lying, which are likely to have increas among children of 11–13 years (p <0,01) and 14–15 years

(p <0,05) and pulling up on a crossbeam (p <0,01) in all age groups (table 2). Therefore, Karate lessons has a significant impact on the strength of young karatekas in all age groups.

Table 2

Indicators of Strength Abilities Among 10–15 Years Karatekas

Age	Hands Flexion-extension in the Emphasis Lying, Number of Times	Pulling up on a Crossbeam, Number of Times
2014–2015 Academic Year		
10–12	40,30±1,54	8,60±0,33
13–14	58,10±2,23	12,0±0,39
2015–2016 Academic Year		
11–13	49,4±1,67**	10,20±0,41**
14–15	65,3±1,82*	14,50±0,62**

We have found the probable increase of endurance among children of all age groups (p <0,01), as indicated by the the results of running at 800 meters distance (table 3). About the level of agility we judged by the test «4 to 9 meters shuttle run», which are likely to have improved (p <0,01) among young karatekas. Therefore, kyokushin karate has a great influence on the development of coordination and stamina among involved children.

Table 3

Indicators of Endurance and Coordination Among 10–15 Years Karatekas

Age	Run 800 m (min, s)	Shuttle run 4 to 9 m (c)
2014–2015 Academic Year		
10–12	3,36±0,04	10,93±0,98
13–14	2,50±0,03	9,58±0,41
2015–2016 Academic Year		
11–13	3,13±0,03**	10,14±0,09**
14–15	2,22±0,01**	9,26±0,05**

The data in table 4 indicate special preparedness of children of 10–15 years engaged in Kyokushin Karate, namely – speed strikes right and left hand for 15 seconds to makivari and strikes «low kick» right and left foot for 15 seconds to makivari. We determined the probable rate impacts growth right hand among the 11–13 years (p <0,05), left hand among the 14–15 years (p <0,05), the right foot among all age groups (p <0,01) and left foot among 11–13 years (p <0,01) and 14–15 years (p <0,05).

Table 4

Indicators of Speed Strikes Among Children 10–15 Years Engaged in Kyokushin Karate

Age	Attacks for 15 s (max. Amount of Times)			
	2014–2015 Academic Year			
	Right Hand	Left Hand	Right Foot	Left Foot
10–12	38,30±0,72	35,60±0,42	19,60±0,26	17,60±0,38
13–14	50,00±1,21	45,80±1,27	23,80±0,47	23,10±0,36
2015–2016 Academic Year				
11–13	40,70±0,52*	38,40±1,44	22,30±0,30**	20,70±0,44**
14–15	53,20±1,00	50,50±0,93*	26,50±0,46**	24,60±0,45*

The obtained data show that children who are involved in Kyokushin Karate have high speed movements for applying powerful punches and kicks. This is achieved by special training, which includes a large variety of exercises using different kinds of equipment: med balls, rubber loops, dumbbells, skipping ropes, boxing paws, pads and others. Therefore, we found that Kyokushin Karate lessons have a significant impact on the development of all the physical qualities of children 10–15 years.

The means of speed training in Kyokushin Karate are the variety of exercises that require quick response, high-speed performance of individual exercise and maximum frequency of movement.

Widespread use in the training process of such exercises as outleap on the curb 40–50 cm, outleap from the place with burden, outleap from starting position of sitting on with a rubber loop, performance of special exercises to develop explosive strength of feet and others leads to a reliable growth of this quality, as

indicated by the results of running 30 meters from a low start. As a result of increasing the strength of legs, the results of running the 100 meters among a group of children 11–13 years are likely to increase, indicating a growth rate. However, among children aged 14–15 years a slight increase in run results has been found, which may be the termination of sensitive periods of speed development and small use of cross anaerobic exercises in the area of energy.

An effective means of improving the integrated high-speed abilities are competitive exercises performed in pairs and using makivary. Exercises are performed with maximum intensity, strength, speed punches (two direct, two low and two side) for 1 minute, kicking (low kick, mavashi-gary into the belly, mavashi-gary into the head) for 1 minute. The exercises to speed reaction are used – karate performs «shadow boxing» and with the signal, takes the emphasis lying down, bending hands, lying and continues to «fight». As a result, the rates of speed of movement and agility indicators have significantly increased, as indicated by amount of strikes for 15 seconds by hands and foots and results of shuttle run.

In the training process of young karatekas there also used exercises of power character: flexion and extension hands in the emphasis lying with their fists, squats with a wide stance, trunk flexion and extension in lying position, jumping rope, complex «Atlante» and others, leading to the development of strength, as evidenced by increase of the probable results pulling on the crossbar and flexion and extension hands in the emphasis lying.

Using a 45-minute cross with mild and moderate pace and continued execution of general developmental systems, specialized and competitive endurance exercise are significantly developed, as indicated by the probable increase of the results of the run for 800 meters.

Therefore, Kyokushin Karate is an effective means of comprehensive development of physical qualities, especially speed-power capabilities.

Conclusions. Analysis of the scientific and methodological literature showed that the development of physical qualities and control of physical fitness among children of 10–15 years who are engaged in Kyokushin Karate has not found adequate coverage.

We have determined that the level of physical fitness among children of 10–15 years who are engaged in Kyokushin Karate, for the year increased significantly, especially in the performance strength ($p < 0,01$), endurance ($p < 0,01$), dexterity ($p < 0,01$) and speed ($p < 0,01$), which is caused by a corresponding amount of the training sessions with complex challenges.

We have determined the probable increase of rate impacts by the right hand among the children of 11–13 years ($p < 0,05$), by the left hand among the children 14–15 years ($p < 0,05$), by the right foot among all age groups ($p < 0,01$) and by the left foot among the children of 11–13 years ($p < 0,01$) and 14–15 years ($p < 0,05$), indicating a high level of preparedness of special children 10–15 years who are engaged in Kyokushin karate.

Prospects for Further Research. Subsequently it is necessary to investigate the age dynamics of the physical properties and content of training loads for older children of school age who are engaged in Kyokushin karate.

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